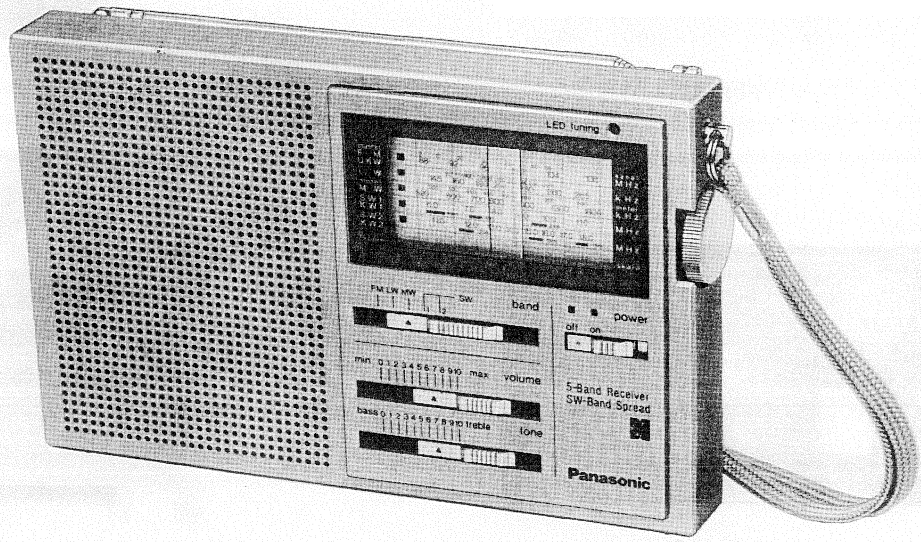
ORDER NO. RD7902-1662C

Service Manual

Radio

FM/LW/MW/SW
5-BAND PORTABLE RADIO

RF-788L



SPECIFICATIONS

Frequency Range:	FM	87.5～108 MHz
	LW	145～285 kHz (2060～1060m)
	MW	520～1610 kHz (577～186m)
	SW_1	5.9～11 MHz (50.8～27.2m)
	SW_2	11～18 MHz (27.2～16.7m)
Intermediate Frequency:	FM	10.7 MHz
	AM (LW, MW & SW)	455 kHz
Sensitivity:	FM	3μV for 50mW output
	LW	200μV/m for 50mW output
	MW	200μV/m for 50mW output
	SW_1	4μV for 50mW output
	SW_2	4μV for 50mW output
Power Output:	500mW Maximum	
Batteries:	6V (Four "AA" size penlight batteries) (National UM-3 or equivalent)	

Speaker:	8 cm (3") PM Dynamic Speaker
Dimensions:	176(Wide) × 113(High) × 32(Deep)mm ($6\frac{15}{16}$" × $4\frac{7}{16}$" × $1\frac{1}{4}$")
Weight:	0.49 kg. (1 lb. 0.6 oz.) without batteries
Impedance:	Speaker 8Ω
	Earphone Jack 8Ω

Specifications are subject to change without notice.

National Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka, Japan

DISASSEMBLY INSTRUCTIONS

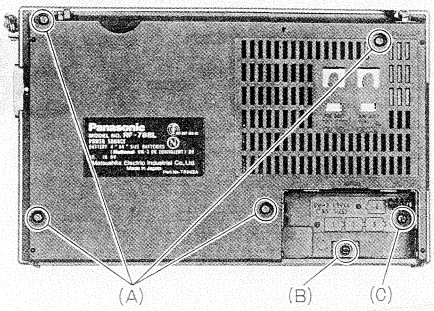


Fig. 1

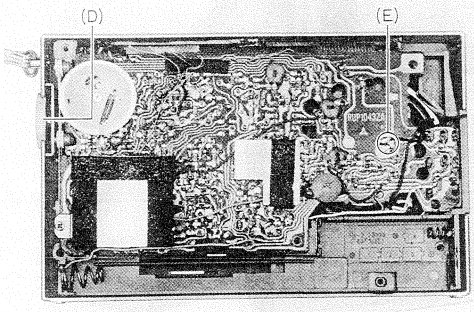


Fig. 2

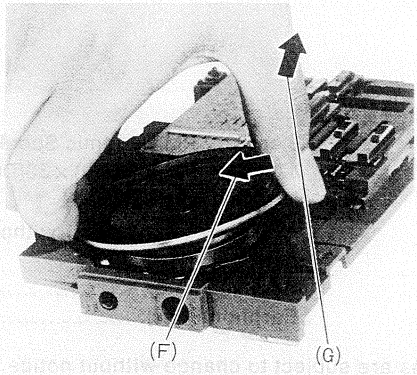


Fig. 3

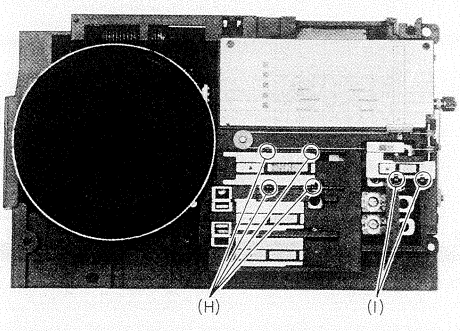


Fig. 4

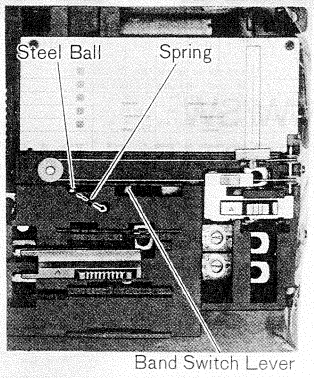


Fig. 5

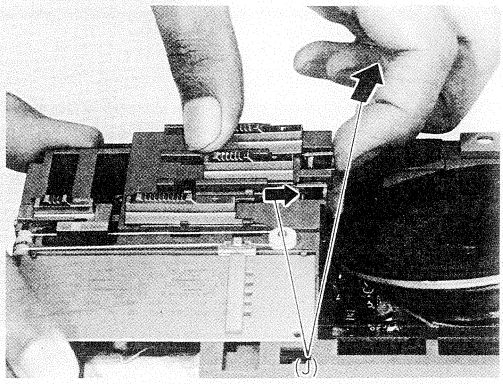


Fig. 6

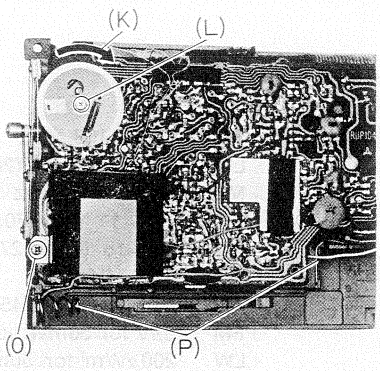


Fig. 7

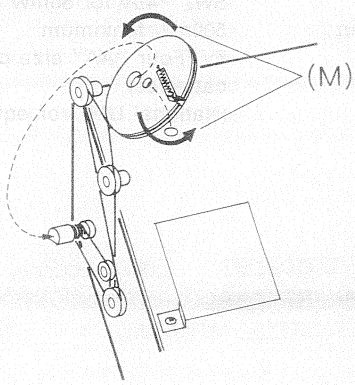


Fig. 8

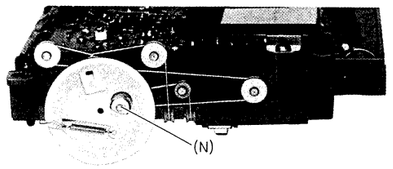


Fig. 9

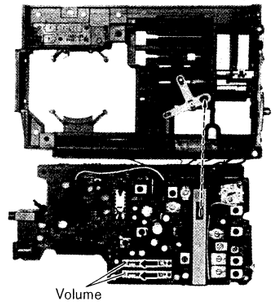


Fig. 10

Procedure	To remove—	Remove—.	Shown in fig—.
1	Chassis	Screws 2.6 × 12(A) × 4	1
2		Screws 2.6 × 10(B) × 1	1
3		Screws 2.6 × 8(C) × 1	1
4		Knob (D)	2
5		Unsolder (E)	2
6	Speaker	Push in the direction of arrow (F)	3
7		Remove in the direction of arrow (G)	3
8	Band knob ※1	Push the catch (H)	4
9	Power knob ※2	Push the catch (I)	4
10	Volume knob	Remove in the direction of arrow (J)	6
11	Circuit Board ※3. 4	Turn the drum fully in the direction of arrow (K)	7
12		Screw 1.7 × 3(L) × 1	7
13		Remove the drum and turn in the direction of arrow (M)	8
14		Insert the drum into the tuning shaft (N) and fix it by adhesive tape.	9
15		Screw 2.6 × 8(O) × 1	7
16		Battery terminal and spring (P) × 2	7

※When disassembly note the followings.

1. Insert the spring and steel ball in the cabinet hole and insert the knob in the hole of band switch lever, as shown in fig. 5.
2. Fix the knob to the lever of power switch.
3. Set band switch and lever to FM position and then insert the band switch in the hole of band switch lever, as shown in fig. 10.
4. Push the volume lever, in the direction of arrow, as shown in fig. 10.

CORD INSTALLATION GUIDE

Note: Cord lengtn is 90cm ($35\frac{7}{16}$'').

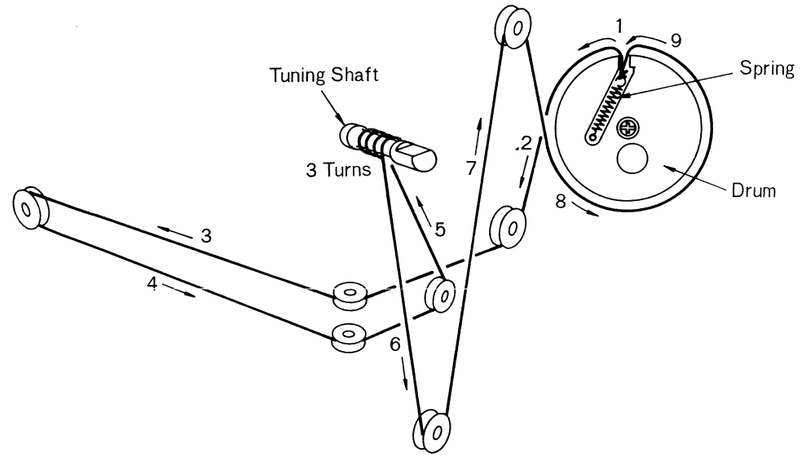


Fig. 11

ALIGNMENT

■ ALIGNMENT POINTS

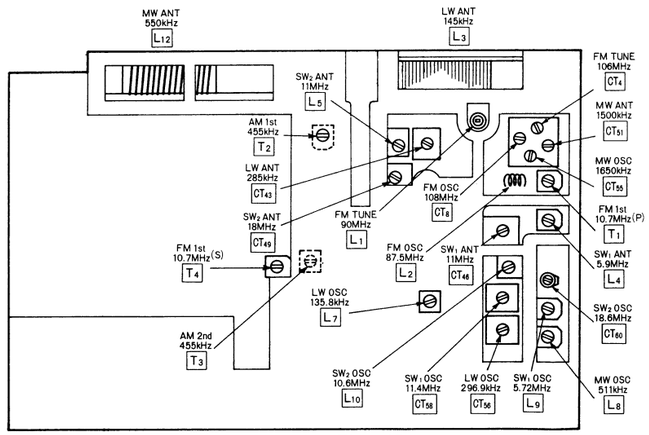


Fig. 12

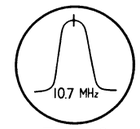


Fig. 13

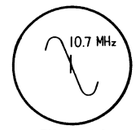


Fig. 14

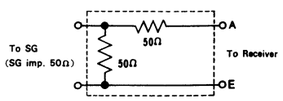
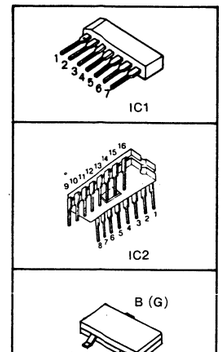
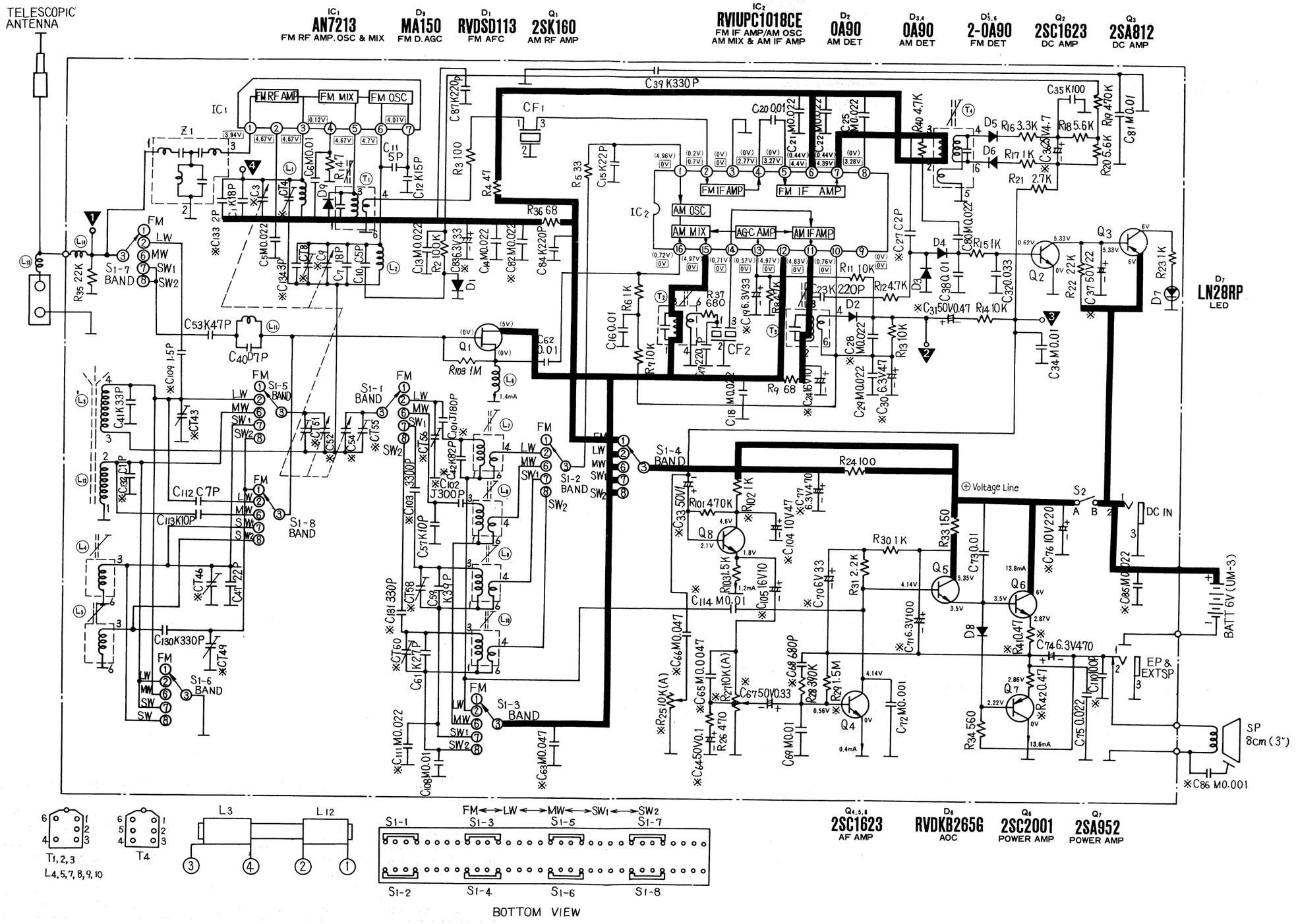


Fig. 15 FM Dummy Ant.

READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT					
Notes: 1. Set power switch to ON. 2. Set volume and treble control to maximum. 3. Set band selector switch to MW, LW, SW_1, SW_2 or FM. 4. Set power source voltage to 6 volts DC. 5. Signal generator output should be set no high than necessary to obtain an output reading, to prevent overlooking.					
SIGNAL GENERATOR		RADIO DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
CONNECTIONS	FREQUENCY				
AM-IF ALIGNMENT					
(1) Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz 30% Mod with 400 Hz.	Point of non-interference. (on/about 600 kHz)	Output meter across voice coil.	T_2 (1st IFT) T_3 (2nd IFT)	Adjust for maximum output.

Schematic Diagram – Model RF-788L





Notes:

1. $S_{1\text{-}1}$~$S_{1\text{-}8}$: Band switch in "FM" position.
2. S_2: Power switch in "OFF" position.
3. For resistors and capacitors, using chips except ※ mark.
4. DC voltage measurements are taken with electronics voltmeter from negative terminal of battery.
   □.....FM position ( ).....MW position
5. Battery current No signal 28mA
   Maximum output 150mA

Circuit Board Wiring View–Model RF-788L

Q1

	MW
S	0V
G	0V
D	5V
S	1.4mA

Q2

C	5.33V
B	0.62V
E	0V

Q3

C	6V
B	5.33V
E	6V
Ic	4mA

Q4

C	4.14V
B	0.56V
E	0V
Ic	0.4mA

Q5

C	5.35V
B	4.14V
E	3.5V

Q6

C	6V
B	3.5V
E	2.87V
Ic	13.8mA

Q7

C	0V
B	2.22V
E	2.86V
Ic	13.6mA

Q8

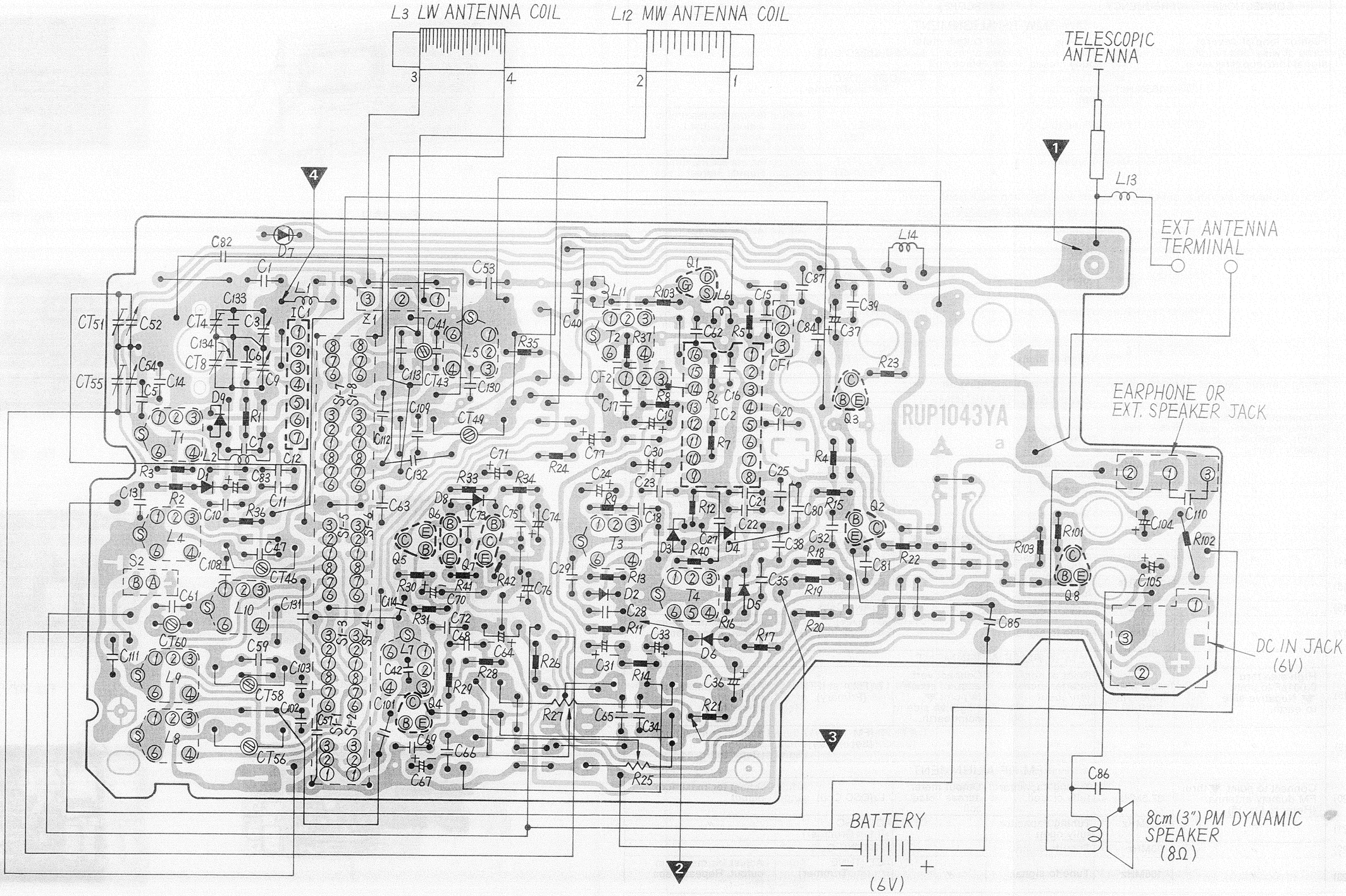
C	4.6V
B	2.1V
E	1.8V
Ie	1.2mA

IC1

	FM
1	3.94V
2	4.67V
3	4.67V
4	0.12V
5	4.67V
6	4.7V
7	4.01V

IC2

	FM	MW		FM	MW
1	0V	4.96V	9	0V	0V
2	0.7V	0.2V	10	0V	0.76V
3	0V	0V	11	0V	4.83V
4	2.77V	0V	12	0V	4.97V
5	3.27V	0V	13	0V	0.57V
6	4.4V	0.44V	14	0V	0.71V
7	4.39V	0.44V	15	0V	4.97V
8	3.28V	0V	16	0V	0.72V



	SIGNAL GENERATOR		RADIO DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
	CONNECTIONS	FREQUENCY				
	MW-RF ALIGNMENT					
(2)	Fashion loop of several turns of wire and radiate signal into loop of receiver.	511kHz	Tuning capacitor fully closed.	Output meter across voice coil.	L_8(OSC Coil)	〃
(3)	〃	1650kHz	Tuning capacitor fully open	〃	CT_{55}(OSC Trimmer)	〃
(4)	〃	550kHz	Tune to signal.	〃	(＊1)L_{12}(ANT Coil)	Adjust for maximum output. Adjust L_{12} by moving coil bobbin along ferrite core.
(5)	〃	1500kHz	Tune to signal.	〃	CT_{51}(ANT Trimmer)	Adjust for maximum output. Repeat steps (2)～(5).
	(＊1) Cement antenna bobbin in place with wax after completing alignment.					
	LW-RF ALIGNMENT					
(6)	〃	135.8kHz	Tuning capacitor fully closed.	〃	L_7(OSC Coil)	Adjust for maximum output.
(7)	〃	296.9kHz	Tuning capacitor fully open	〃	CT_{56}(OSC Trimmer)	〃
(8)	〃	145kHz	Tune to signal.	〃	(＊2)L_3(ANT Coil)	Adjust for maximum output. Adjust L_3 by moving coil bobbin along ferrite core.
(9)	〃	285kHz	Tune to signal.	〃	CT_{43}(ANT Trimmer)	Adjust for maximum output. Repeat steps (6)～(9)
	(＊2) Cement antenna bobbin in place with wax after completing alignment.					
	SW_1-RF ALIGNMENT					
(10)	Connect to test point to ▼ through ceramic capacitor (10pF). Negative side to earth.	5.72MHz	Tuning capacitor fully closed.	〃	L_9(OSC Ciol)	Adjust for maximum output.
(11)	〃	11.4MHz	Tuning capacitor fully open.	〃	CT_{58}(OSC Trimmer)	〃
(12)	〃	5.9MHz	Tune to signal	〃	L_4(ANT Coil)	〃
(13)	〃	11MHz	Tune to signal	〃	CT_{46}(ANT Trimmer)	Adjust for maximum output. Repeat steps (10)～(13).
	SW_2-RF ALIGNMENT					
(14)	〃	10.6MHz	Tuning capacitor fully closed	〃	L_{10}(OSC Coil)	Adjust for maximum output.
(15)	〃	18.6MHz	Tuning capacitor fully open.	〃	CT_{60}(OSC Trimmer)	〃
(16)	〃	11MHz	Tune to signal	〃	L_5(ANT Coil)	〃
(17)	〃	18MHz	Tune to signal	〃	CT_{49}(ANT Trimmer)	Adjust for maximum output. Repeat steps (14)～(17).
	FM-IF ALIGNMENT					
(18)	High side thru. 0.001μF to point ▼, Negative side to earth.	10.7 MHz (400 kHz SWP).	Point of non-interference. (on/about 90 MHz).	Connect vert. amp. of scope to point ▼, Negative side to point earth.	T_1(FM 1 st IFT) (Primary)	Adjust for maximum amplitude. (Refer to fig. 13)
(19)	〃	〃	〃	〃	T_4(FM 1st IFT) (Secondary)	Adjust for maximum amplitude. (Refer to fig. 14.)
	FM-RF ALIGNMENT					
(20)	Connect to point ▼ thru. FM dummy antenna. (Refer to fig. 15)	87.5MHz	Tuning capacitor fully closed.	Output meter across voice coil.	L_2(OSC Coil)	Adjust for maximum output
(21)	〃	108MHz	Tuning capacitor fully open.	〃	CT_8(OSC Trimmer)	〃
(22)	〃	90MHz	Tune to signal.	〃	L_1(TUNE Coil)	〃
(23)	〃	106MHz	Tune to signal.	〃	CT_4(TUNE Trimmer)	Adjust for maximum output. Repeat steps (20)～(23).

CABINET & CHASSIS PARTS

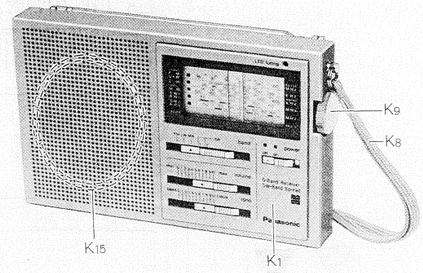


Fig. 16

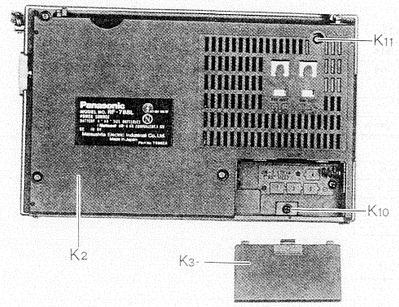


Fig. 17

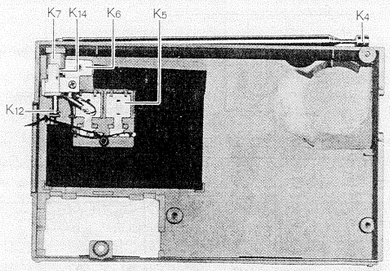


Fig. 18

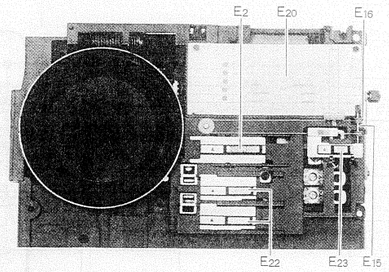


Fig. 19

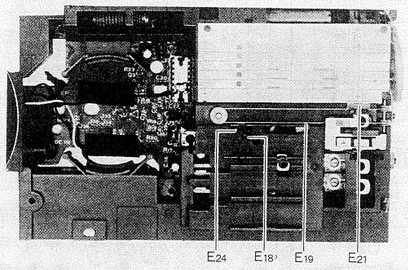


Fig. 20

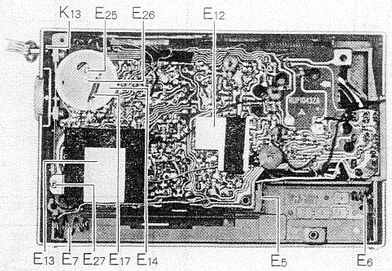


Fig. 21

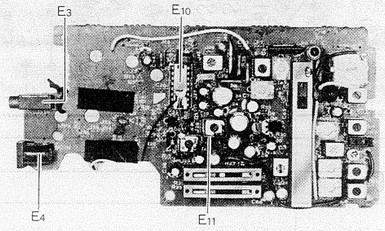


Fig. 22

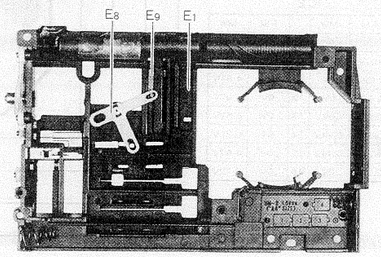


Fig. 23

■REPLACEMENT PARTS LIST ..... Model RF-788L

(RD7902-1662C)

NOTES : 1. Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
2. Ⓢ marks are service standard parts and may differ from production parts.
3. The ○ mark is used by the manufacturing plant only.

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
INTEGRATED CIRCUITS, TRANSISTORS AND DIODES					
IC1	AN7213	IC, FM RF Amp.	1		
IC2	RV1UPC1018CE	IC, FM/AM IF Amp.	1		
Q1	2SK160	Transistor (Si), AM RF Amp.	1		
Q2,4,5,8	2SC1623	Transistor (Si), DC Amp., AF Amp.	4		
Q3	2SA812	Transistor (Ge), DC Amp.	1		
Q6	2SC2001	Transistor (Si), Power Amp.	1		
Q7	2SA952	Transistor (Ge), Power Amp.	1		
D1	RVDSD113	Diode (Si), FM AFC	1		Ⓢ
D2,3,4	OA90	Diode (Ge), AM Detector	3		Ⓢ
D5,6	2-OA90	Diode (Ge), FM Detector	1 Pair		Ⓢ
D7	LN28RP	Diode (Ga), LED	1		
D8	RVDKB265G	Diode (Si), Operation Compensator	1		
D9	MA161	Diode (Si), FM D.AGC	1		Ⓢ
CERAMIC FILTERS, COILS AND TRANSFORMERS					
CF1	RVF107MFR	Ceramic Filter	1		
CF2	RVFCFM2455B	Ceramic Filter	1		
L1	RLD4N30	Tuning Coil, FM	1		
L2	RLD4Y53	Oscillator Coil, FM	1		
L3,12	RLF6D12	Antenna Coil, LW, MW	1	○	
L4	RLO3M66	Antenna Coil, SW1	1	○	
L5	RLA3M9	Antenna Coil, SW2	1		
L7	RLO1M5	Oscillator Coil, LW	1		
L8	RLO2M15	Oscillator Coil, MW	1		
L9	RLO3M31	Oscillator Coil, SW1	1		
L10	RLO3M69	Oscillator Coil, SW2	1	○	
T1	RLI4M101	IFT, FM	1		Ⓢ
T2	RLI2M213	IFT, AM	1		
T3	RLI2M409	IFT, AM	1	○	
T4	RLI4M509	IFT, FM	1		
VARIABLE RESISTORS					
R25	EVAH11R06A14	Variable Resistor, 10KΩ (A), Tone Control	1	○	
R27	EVAH12R06ABB	Variable Resistor, 10KΩ (A), Volume Control	1	○	
VARIABLE CAPACITORS					
C3,9,52,54	RCV4QC4N	Tuning Capacitor, W/Trimmer Capacitor (C4,8,51,55)	1	○	

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
C43,46,49,56	RCV1PX20AGS	Trimmer Capacitor	4		
C58	RCV1PX30AGS	Trimmer Capacitor	1		
C60	ECV1ZW20X53N	Trimmer Capacitor	1		
COMPONENT COMBINATION					
Z1	RXABPMB1	Component Combination	1		
SPEAKER					
SP	EAS8P24S	Speaker, Imp. 8Ω, 8cm (3"), PM Dynamic	1		
SWITCHES					
S1-1~S1-8	RSS5H01Z	Switch, Band	1		
S2	RSS2A16Z	Switch, Power	1		
RESISTORS					
R5	RRD18XK330	33Ω, 1/8 Watt, ±10%, Chip	1		
R1,4	RRD18XK470	47Ω, 1/8 Watt, ±10%, Chip	2		
R9,36	RRD18XK680	68Ω, 1/8 Watt, ±10%, Chip	2		
R3,24	RRD18XK101	100Ω, 1/8 Watt, ±10%, Chip	2		
R33	RRD18XK151	150Ω, 1/8 Watt, ±10%, Chip	1		
R26	RRD18XK471	470Ω, 1/8 Watt, ±10%, Chip	1		
R34	RRD18XK561	560Ω, 1/8 Watt, ±10%, Chip	1		
R37	RRD18XK681	680Ω, 1/8 Watt, ±10%, Chip	1		
R6,15,17,23, 30	RRD18XK102	1KΩ, 1/8 Watt, ±10%, Chip	5		
R103	RRD18XK152	1.5KΩ, 1/8 Watt, ±10%, Chip	1		
R31	RRD18XK222	2.2KΩ, 1/8 Watt, ±10%, Chip	1		
R21	RRD18XK272	2.7KΩ, 1/8 Watt, ±10%, Chip	1		
R16	RRD18XK332	3.3KΩ, 1/8 Watt, ±10%, Chip	1		
R12,40	RRD18XK472	4.7KΩ, 1/8 Watt, ±10%, Chip	2		
R18,20	RRD18XK562	5.6KΩ, 1/8 Watt, ±10%, Chip	2		
R28	RRD18XK394	390KΩ, 1/8 Watt, ±10%, Chip	1		
R7,11,13,14	RRD18XK103	10KΩ, 1/8 Watt, ±10%, Chip	4		
R22,35	RRD18XK223	22KΩ, 1/8 Watt, ±10%, Chip	2		
R8	RRD18XK473	47KΩ, 1/8 Watt, ±10%, Chip	1		
R2	RRD18XK104	100KΩ, 1/8 Watt, ±10%, Chip	1		
R19,101	RRD18XK474	470KΩ, 1/8 Watt, ±10%, Chip	2		
R103	RRD18XK105	1MΩ, 1/8 Watt, ±10%, Chip	1		
R102	ERD25TJ102	1KΩ, 1/4 Watt, ±5%, Carbon	1		Ⓢ
R29	ERD25TJ155	1.5MΩ, 1/4 Watt, ±5%, Carbon	1		Ⓢ
R41,42	ERX12ANJR47	0.47Ω, 1/2 Watt, ±5%, Metal	2		Ⓢ
CAPACITORS					
C10,11	ECUX1H050DC	5PF, 50WV, ±0.5PF, Chip	2		
C40	ECUX1H070DC	7PF, 50WV, ±0.5PF, Chip	1		
C12	ECUX1H150KC	15PF, 50WV, ±10%, Chip	1		
C15,47	ECUX1H220KC	22PF, 50WV, ±10%, Chip	2		
C113	ECUX1H100KC	10PF, 50WV, ±10%, Chip	1		
C1,7	ECUX1H180KC	18PF, 50WV, ±10%, Chip	2		
C41	ECUX1H330KC	33PF, 50WV, ±10%, Chip	1		
C61	ECUX1H270KC	27PF, 50WV, ±10%, Chip	1		

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
C53	ECUX1H470KC	47PF, 50WV,±10%, Chip	1		
C35	ECUX1H101KD	100PF, 50WV,±10%, Chip	1		
C17,23,84,87	ECUX1H221KD	220PF, 50WV,±10%, Chip	4		
C39,130	ECUX1H331KD	330PF, 50WV,±10%, Chip	2		
C59	ECUX1H390KC	39PF, 50WV,±10%, Chip	1		
C72	ECUX1H102MD	0.001μF, 50WV,±20%, Chip	1		
C65	ECUX1H472MD	0.0047μF,50WV,±20%, Chip	1		
C16,20,62,73	ECUX1H103ZF	0.01μF, 50WV,±80-20%, Chip	4		
C6,38,69,81, 34,108	ECUX1H103MD	0.01μF, 50WV,±20%, Chip	6		
C75	ECUX1H223ZF	0.022μF, 50WV,±80-20%, Chip	1		
C5,13,14,18, 21,22,25,29 80	ECUX1H223MD	0.022μF, 50WV,±20%, Chip	9		
C32	ECUX1H333ZF	0.033μF, 50WV,±80-20%, Chip	1		
C134	ECCD1H030C	3PF, 50WV,±0.25PF,Ceramic	1		
C57	ECCD1H100KC	10PF, 50WV,±10%, Ceramic	1		
C132	ECCD1H010C	1PF, 50WV,±0.25PF,Ceramic	1		
C109	ECCD1H1R5C	1.5PF, 50WV,±0.25PF,Ceramic	1		
C110	ECCD1H101K	100PF, 50WV,±10%, Ceramic	1		
C112	ECCD1H070DC	7PF, 50WV,±0.5PF, Ceramic	1		
C42	ECCD1H820KC	82PF, 50WV,±10%, Ceramic	1		
C27,133	ECCD1H020C	2PF, 50WV,±0.25PF,Ceramic	2		
C68	ECKD1H681KB	680PF, 50WV,±10%, Ceramic	1		
C86	ECKD1H102MD	0.001μF, 50WV,±20%, Ceramic	1		
C101	ECMS05181JH	180PF, 50WV,±5%, Mica	1		
C103	ECQS05332KZ	3300PF, 50WV,±10%, Styrol	1		
C102	ECQS05301JZ	300PF, 50WV,±5%, Styrol	1		
C131	ECQS05331JZ	330PF, 50WV,±5%, Styrol	1		
C63	ECQG05473MZ	0.047μF, 50WV,±20%, Polyester	1		
C114	ECFVD103MD	0.01μF, 25WV,±20%, Semi-Conductor	1		
C28,82,85, 111	ECFVD223MD	0.022μF, 25WV,±20%, Semi-Conductor	4		
C66	ECFVD473MD	0.047μF, 25WV,±20%, Semi-Conductor	1		
C19,70,83	ECEA1CS330	33μF, 16WV, Electrolytic	3		Ⓢ
C30,104	ECEA1AS470	47μF, 10WV, Electrolytic	2		Ⓢ
C74,77	ECEA0JS471	470μF, 6.3WV, Electrolytic	2		Ⓢ
C36	ECEA1JS4R7	4.7μF, 63WV, Electrolytic	1		Ⓢ
C37	ECEA2AS2R2	2.2μF, 100WV, Electrolytic	1		Ⓢ
C24,105	ECEA1HS100	10μF, 50WV, Electrolytic	2		Ⓢ
C71	ECEA1AS101	100μF, 10WV, Electrolytic	1		Ⓢ
C76	ECEA1CS221	220μF, 16WV, Electrolytic	1		Ⓢ
C64	ECEA50ZR1	0.1μF, 50WV, Electrolytic	1		Ⓢ
C31	ECEA50ZR47	0.47μF, 50WV, Electrolytic	1		Ⓢ
C67	ECEA50ZR33	0.33μF, 50WV, Electrolytic	1		Ⓢ
C33	ECEA50Z1	1μF, 50WV, Electrolytic	1		Ⓢ
		CABINET			
K1	RYMF788LXG8	Cabinet Assembly	1		○
K2	RYFF788LXG7	Cabinet Cover Assembly	1		○
K3	RYNF788N7	Battery Cover Assembly	1		○
K4	XEARR130GAY	Telescopic Antenna,7 steps, 772mm	1		
K5	RJT636Z	Terminal,EXT.Antenna	2		
K6	RJT649Z	Terminal,Telescopic Antenna	1		
K7	RMA5083Z	Holder,Telescopic Antenna	1		

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
K8	RKH92Z	Hand Strap	1		
K9	RBN480Z	Knob,Tuning	1		
K10	XTN26+10BFZ	Screw,Cabinet Cover	1		
K11	XTN26+12CFC	Screw,Cabinet Cover	4		
K12	XUC2FT	Circlip,Telescopic Antenna	1		Ⓢ
K13	XUC3FT	Circlip,Hand Strap	1		Ⓢ
K14	RHM89Z	Stopper,Telescopic Antenna	1		
K15	RHG717Z	Rubber,Speaker	1		
		CHASSIS			
E1	RZAF788LXG	Chassis Assembly	1		○
E2	RYTF788LXG	Knob Assembly,Band	1		○
E3	RJJ32E	Jack,EP,EXT.SP	1		Ⓢ
E4	RJJ97Y	Jack,DC IN	1		
E5	RJC326A	Terminal,Battery ⊕ Side	1		
E6	RJC730Z	Terminal,Battery ⊕,⊖ Side	1		
E7	RJC735Z	Spring,Battery ⊖ Side	1		
E8	RUB171Z	Lever,Band Switch	1		
E9	RGK857Z	Indicator,Band	1		
E10	RMC171Y	Shield Cover,IC	1		
E11	RMC272Z	Shield Cover,IFT (T3,4)	2		
E12	RMC567Z	Shield Cover,PC Board	1		
E13	RMC568Z	Shield Cover,PC Board	1		
E14	RDD308Z	Drum,Dial	1		
E15	RDY42Z	Shaft,Pulley	1		
E16	RDR26Z	Pulley,Dial	2		
E17	RDS2052Z	Spring,Dial	1		
E18	RDS3040Z	Spring,Band Knob	1		
E19	RDZ03Y	Cord,Dial	1Roll		
E20	RKD509Y	Scale,Dial	1		○
E21	RDP775Z	Pointer,Dial	1		
E22	RBD69Z	Knob,Tone & Volume	2		
E23	RBD71Z	Knob,Power	1		
E24	RNE901	Steel Ball,Band Knob	1		
E25	XSM17-3BN	Screw,Tuning Capacitor M'tg	2		
E26	XSHR17+2FZ	Screw,Dial Drum M'tg	1		
E27	XTN26+8B	Screw,PC Board M'tg	3		
		ACCESSORIES			
	RQD132Y	Case	1		○
	XEH1A1-P	Magnetic Earphone	1		Ⓢ
		PACKING MATERIALS			
	XZB26×20A04	Polyethylene Cover	2		Ⓢ
	RPF9Z	Polyethylene Cover	1		
	RPH337Z	Soft Sheet	1		○
	RPE297Z	Display Stand	1		○
	RPE296Z	Cover	1		○
	RPN2825Z	Pad	1		○
	RPK756Z	Gift Box	1		○
	RQX6412Z	Instruction Book	1		○

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